

council. Substantial agreement has been arrived at between the three colleges, which have constituted Victoria University, as to a common matriculation examination for all the three Universities of Yorkshire, Manchester, and Liverpool, and provision has been made for a joint board to be constituted from the three Universities to deal with the question. The additions to the staff and equipment of the college essential to the proper carrying on of an independent University will, it is thought, require a *minimum* additional expenditure of about 7000*l.* a year, while extensive additions will also be required to the college buildings. The coal-owners of Yorkshire have decided to erect a separate building for the mining department, and have collected a sum of 5500*l.* for the purpose. The council of the college is desirous also of completing the main block of the college, and it is estimated that this would cost about 60,000*l.* Three friends of the college have each promised 5000*l.*, while a fourth has promised 2000*l.* The Clothworkers' Company of London offers to transfer to the new University as its absolute property the whole of the buildings and equipment of the textile industries, dyeing and art departments, which are at present held in trust by the college for the Clothworkers' Company. Attached to the offer is a condition that these departments shall be recognised as integral parts of the University. The Company has also promised to grant in perpetuity to the University for the maintenance of these departments an annual sum of not less than 4000*l.* This means a gift to the University of a capitalised sum of upwards of 200,000*l.*

WE learn from the *Pioneer Mail* that the Government of India has addressed to the Bombay Government a long letter on the subject of the proposed Tata endowment of a research institute for India. It is in the main an explanation of the delay of four years which has occurred in giving effect to the scheme. As has been already explained in these columns, the scheme owes its origin to the munificent intentions of Mr. J. N. Tata, who in 1896 proposed to vest in trustees properties in Bombay, representing a capital of thirty lakhs of rupees, in order that the net income, amounting to some 8000*l.*, might be applied towards the endowment of a research institute for India. The proposal soon assumed the form of an Imperial teaching university, intended to train Indian graduates in scientific research, to confer degrees, and to select the best students for further training in Europe and America. Mr. Tata was later asked to consider whether the original scheme was not too ambitious, and whether it might not be proceeded with, so far as funds permitted, leaving the further development to come with the growth of income. Mr. Tata met a small conference of educational experts, and with them defined the general principles to be kept in view in launching the scheme. Sir William Ramsay was invited to visit India to advise, and the help of other experts was obtained. Much delay has been caused by a consideration of numerous recommendations received, but we are glad to know that financial difficulties appear to have been overcome, and that legislation will probably soon follow with a view to provide India with an institution for higher scientific instruction. The institute is to be located at Bangalore, and the Mysore durbar, in addition to making a free grant of land, has undertaken to contribute 3333*l.* per annum for a period of ten years. The Government of India is prepared to make a similar annual subsidy. This will raise the income to 15,000*l.* per annum, which exceeds by 1000*l.* the highest estimate of necessary expenditure framed by Sir William Ramsay. The Government also proposes to contribute one lakh of rupees towards the cost of the construction and equipment of the necessary buildings. The institute is to comprise a department of chemistry, a department of experimental physics, and a department of experimental biology.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 14.—"The Combination of Hydrogen and Chlorine under the Influence of Light." By P. V. **Bevan**. Communicated by Prof. J. J. Thomson, F.R.S.

The first point studied in this investigation was the initial expansion, or Draper effect, when light is allowed to fall on a mixture of hydrogen and chlorine. This expansion

was shown to be due to heat developed by the combination of the hydrogen and chlorine to form hydrochloric acid. The heat effect was measured by the change in resistance observed in a fine platinum wire sealed through the bulb in which the gas mixture was exposed to light. The investigation then considers the period of induction of Bunsen and Roscoe, and the effects of various intensities of light on the rate of combination. Experiments were also made on the effect of illuminating chlorine before mixing with hydrogen, and the original observation of Draper—that the combination takes place more readily after this preillumination—was confirmed. If, however, the gases be bubbled through water after preillumination of chlorine, this effect is destroyed, and the gases behave like the ordinary mixture. To obtain evidence of an intermediate compound, the gases were submitted to sudden expansion producing supersaturation. When the gases were dust free a nucleus-forming substance occurred after illumination, so that on the expansion a cloud was formed when the supersaturation reached a certain amount. In the non-illuminated gas mixture no cloud-producing substance could be observed with yellow light. This cloud is produced in chlorine alone. In the mixture of hydrogen and chlorine the cloud appears before any hydrochloric acid is formed. The theoretical part of the paper considers the action as taking place in three stages, combination to form complex molecules containing hydrogen chlorine and water molecules occurring, and then a break down of this complex system giving hydrochloric acid and water. The view thus taken explains the chief features of the induction period, and can be extended to apply to other similar actions where a catalyser is necessary for the progress of the action.

"On the Photo-electric Discharge from Metallic Surfaces in Different Gases." By W. Mansergh **Varley**, M.Sc., Ph.D. Communicated by Prof. J. J. Thomson, F.R.S.

The object of the experiments was to study the effect of the pressure and nature of the gas with which a metal surface is surrounded upon the magnitude of the photo-electric current from that surface, the method used being to draw the complete curves connecting the current and the potential difference at each pressure or in each gas examined, keeping the intensity of the ultra-violet illumination and the other conditions unaltered.

A suitable source of ultra-violet light which would remain constant in intensity while long series of observations were being taken was ultimately found in the spark between iron terminals in an atmosphere of pure dry hydrogen. The spark gap was in parallel with three Leyden jars in the secondary circuit of an induction coil used as a transformer. The photo-electric currents were measured from a metal surface placed a few millimetres behind a fine gauze, through which the light passed, and which served as the positive electrode. A brass vessel, with a quartz window to admit the light, served to contain the electrodes.

Series of curves were obtained showing the relation between the photo-electric current and the potential at pressures ranging from 760 mm. to 0.0014 mm. They show that down to pressures of about 1 mm. no true saturation currents exist, the currents always increasing with the potential, but less rapidly for a certain range of potential gradients than for lower or higher potential gradients, while at pressures below the critical pressure true saturation currents exist.

Curves connecting the potentials and corresponding photo-electric currents in air, carbon dioxide, hydrogen and carbon monoxide at various pressures were also obtained, and it was shown that the curves could all be explained on the ionic theory of conduction, both qualitatively and quantitatively. Zinc, platinum and aluminium electrodes were employed.

"On the Discovery of a Species of Trypanosoma in the Cerebro-spinal Fluid of Cases of Sleeping Sickness." By Aldo **Castellani**, M.D. Communicated by the Malaria Committee of the Royal Society.

The author states that he has found trypanosomes to be present in the cerebro-spinal fluid in twenty out of thirty-four cases of sleeping sickness examined; in two of the cases trypanosomes were also found in the lateral ventricles, and in one in the blood taken from the finger. The cerebro-spinal fluid was obtained by lumbar puncture, and as the trypanosomes are not numerous, it was first centri-

fugalised and the deposit examined microscopically. This species of trypanosoma seems to differ from that found in human trypanosomiasis (*T. Gambiense*, Dutton) by being less motile, by the micro-nucleus being situated nearer the extremity, and by the vacuole being larger. Should it prove to be a new species, the author suggests that it should be named the *Trypanosoma Ugandense*. The author had previously isolated a streptococcus in this disease; he now suggests as a working hypothesis that sleeping sickness is due to a trypanosoma, and that in the last stages there is a concomitant streptococci infection.

In a note to this communication the secretary of the Royal Society (Sir M. Foster) states that a telegram has been received from Colonel Bruce, who is continuing Dr. Castellani's investigations in Uganda, announcing that he has found trypanosomes in the cerebro-spinal fluid in every one of thirty-eight cases examined, and in the blood in twelve out of thirteen cases.

Physical Society, May 22.—Dr. R. T. Glazebrook, F.R.S., president, in the chair.—Mr. J. Stöttner gave an exhibition of Nernst lamps, showing their development from the experimental form up to the most recent types. The oxides used for the glowers are thorium, zirconia, and other rare earths thereto related, such as oxides of yttrium and cerium. A paste of these is formed, and small rods or tubes are pressed through a suitable nozzle. These are hardened and cut into small lengths, and practically the principal part of the lamp is finished. The chief difficulty in the practical lamp is in the design of a durable automatic heater to heat the filament up to conducting point. A number of automatic arrangements which have been designed for disconnecting the heater were shown. Another important part of a Nernst lamp is the bolstering resistance, which in its final development consists of a thin iron wire sealed in a glass bulb filled with hydrogen gas. If a lamp is used without a bolstering resistance, as soon as a certain critical potential is reached the current increases, at first slowly and then quicker and quicker, the potential remaining constant, until the lamp burns itself out.—Mr. T. H. Blakesley gave an exhibition of a diagram for single-piece lenses. The properties of a single-piece lens are determined by four factors:—the two radii of curvature, the thickness of the lens, and the value of the refractive index of the material of which it is composed. In the case of a lens of a particular thickness made of a material of definite refractive index, the variables reduce to two, namely, the ratios of the radii of curvature to the thickness of the lens. Any property of the lens requires a relation between these quantities. It is therefore possible, for any property, to draw a curve, with r_1/d as ordinates and r_2/d as abscissæ, such that any point on the curve represents a lens having that property. Mr. Blakesley has drawn curves representing several properties. Where two curves cut there is a point which gives a lens having the properties due to both curves. By means of such a diagram various lenses have been constructed, and three of them were shown at the meeting. Of these, one was equivalent to a Huyghens eye-piece and another to a collimator.—A paper on an instrument for measuring the lateral contraction of tie-bars, and on the determination of Poisson's ratio, was read by Mr. J. Morrow. Practical methods for the determination of the ratio of lateral to linear strain in a tie-bar may be divided into three classes. First, those in which two coefficients of elasticity are determined and Poisson's ratio calculated; second, those depending on the deformation of the section of a beam; and lastly, methods by which the two strains are actually measured. The experiments described in the paper belong to the third. From a table of results, it appears that the average values of σ are for mild steel 0.275, Sheffield spindle steel 0.276, wrought iron 0.277, Muntz metal 0.341, and drawn copper 0.327. The specimens were not annealed, and were mostly about one inch in diameter. For the experiments on cast iron, two series of specimens were carefully cast of material of good average quality. These were loaded several times in order to eliminate permanent set. The first series gave an average value $\sigma = 0.246$ and the second $\sigma = 0.252$.

Chemical Society, May 20—Prof. W. A. Tilden, F.R.S., president, in the chair.—The following papers were read:—The conditions of decomposition of ammonium nitrite, by V. H. Velej. The decomposition of ammonium nitrite into

nitrogen and water proceeds according to the general law $\log. A/A-x = at$, whether the reaction follows its normal course or is accelerated by the addition of another substance. The decomposition is either impeded or stopped by ammonia, aliphatic, benzenoid or pyridine amines and aromatic hydrazines, and to a less degree by oximes, but is accelerated by aliphatic amides.—Freezing point curves for some binary mixtures of organic substances, chiefly phenols and amines, by Dr. J. C. Philip. When freezing point curves for mixtures of two substances are constructed two types are obtained:—(a) a curve consisting of two branches, starting from the freezing points of the constituents and cutting each other at a eutectic point; (b) the two branches are cut by a third intermediate curve, which may sometimes have a summit. Examples of the latter type have been found for the systems phenol—urea, p-cresol—aniline, phenol— α -naphthylamine, phenol—p-toluidine, α -naphthol—p-toluidine, phenol—picric acid.—Isomeric partially racemic salts containing quinequivalent nitrogen. Part xi. Derivatives of *dl*-methylhydrindamine and *dl*-neo-methylhydrindamine. Isomeric salts of the type $NR_2R_3H_3$, by G. Tattersall and F. S. Kipping. A description of these compounds was given.—The action of liquefied ammonia on chromic chloride, by W. R. Lang and C. M. Carson. In this reaction a salmon-coloured powder is produced from which water extracts two unstable, crystalline compounds with the formulæ $Cr_2Cl_6 \cdot 12NH_3 \cdot 2H_2O$ and $Cr_2Cl_6 \cdot 10NH_3$.—Note on the action of methylamine on chromic chloride, by W. R. Lang and E. H. Jolliffe. The reaction is similar to the foregoing, the product being a pink substance of the composition $Cr_2Cl_6 \cdot 10CH_3 \cdot NH_3$.—Cholesterol, by R. H. Pickard and J. Yates. The oxidation and hydrolytic products of cholesterol obtained from gall stones have been studied; among the former is arachidic acid.—Sulphocamphenolcarboxylic acid, by Messrs. Hardy and Lapworth.—Optically active esters of β -ketonic and β -aldehydic acids. iii. Azo-derivatives of menthyl acetate, by A. Lapworth.—Hydrogen cyanide in fodder plants, by J. C. Brünich. The observation of Dunstan and Henry that the amount of prussic acid producible from the Sorghum plant increases as the plant matures and decreases after the production of seed has been confirmed by a series of determinations of the prussic acid obtainable from manured and unmanured plants at all stages of growth.—The chemical reactions involved in the rusting of iron, by Prof. W. R. Dunstan, F.R.S.. It is shown that the presence of liquid water and oxygen is necessary for the formation of iron rust; this action is merely accelerated, not conditioned by the presence of carbon dioxide. No rusting occurs when pure iron is kept in presence of oxygen and water vapour at constant temperature; the rusting of iron is prevented by the presence of solutions of such salts as decompose hydrogen peroxide, whilst its formation is not inhibited in solutions of salts in presence of which hydrogen peroxide is stable. The deduction is therefore drawn that hydrogen peroxide is the active agent in the production of iron rust.

Geological Society, April 29.—Mr. J. J. H. Teall, F.R.S., vice-president, in the chair.—The age of the principal lake-basins between the Jura and the Alps, by Dr. Charles S. Du Riche Preller. The author deals with the question reserved from a preceding paper, that is, to which subsequent period the formation of Swiss lake-basins should be assigned. By the light of further recent investigations in the different localities, he first considers the conditions of the Zurich lake-valley, and then applies his conclusions to the other principal lake-basins lying in the same zone along the edge of the Alps. Evidence is adduced to show that the deep-level gravel-beds in the Limmat Valley near and below Zurich are essentially fluvial, composed of the characteristic Alpine material of the Rhine and Linth drainage-areas, and similar to the gravel now carried by the River Sihl. These gravel-beds rest upon Glacial clay of the second glaciation, which fills the Molasse-bed of the valley to a great depth, and are overlain by the moraine-bars of the third glaciation, the latter being overlain by the post-Glacial alluvia of the Sihl. On mechanical grounds, it is difficult to conceive how glaciers could either bridge or completely fill with ice such extensive basins as those of the principal Alpine lakes. As regards the more recently enunciated

argument of the Deckenschotter and overlying gravel-exposure in the Lorze Valley, apart from the difficulty of differentiating the second and third glaciation materials in that locality, it is hazardous to deduce from a local phenomenon, and more especially from any dip of loose gravel, the date of the zonal bending extending over more than 200 miles along the edge of the Alps. The author suggests that the deep-level Limmat gravel beds were deposited by a river during the second inter-Glacial period; that the lowering of the valley floor was initiated in the course of the third glaciation; that the zonal subsidence continued throughout the retreat of the ice; and that the simultaneous formation of the lake-basin should be assigned to the end of the Glacial period. The same arguments apply also to the origin and age of the other principal zonal lake-basins. In his view, the position and depth of these basins, as well as the intervening ground, point to the probability that the bending took place not only along one line, but along several, that the bending was by no means of uniform depth, and that therefore the Alps did not subside as a rigid mass, but that the zonal bending along their edge merely extended locally for some distance from the deepest points of the lake-basins along the floors of the principal Alpine river valleys.—On a shelly Boulder-clay in the so-called palagonite formation of Iceland, by Helgi Pjetursson. There is no equivalent in the Tertiary basalt plateaux of Britain of the great palagonite formation of Iceland. The basement layer of the breccia formation, resting directly upon the basalts, contains glaciated blocks of all sizes. These ground moraines are followed by tuffaceous sandstones, conglomerate, columnar basalts, other ground moraines, and volcanic tufts and breccias. At Birlandshöfði a shelly Boulder-clay, 70 to 80 feet thick, rests upon the fundamental basalt, which here shows a glaciated surface. Unbroken shells are very rare. *Astarte borealis* is the most common shell, and *Saxicava arctica* and *Mya truncata* are less common, indicating that some of the older moraines are of Pleistocene age. The author concludes that volcanic activity did not pause in Iceland during the Glacial period, but that it was especially active at the beginning and the close of glaciation.

Anthropological Institute, May 5.—Mr. H. Balfour, the president, exhibited a stone celt, worn as an amulet, from Benin; some silver *ex voto* offerings from Malabar, and a dagger from Siam, on the sheath of which were natural markings, interpreted by the natives to represent the name of Allah.—Mr. A. L. Lewis read a paper on some stone circles in Derbyshire. Mr. Lewis first dealt with the Arborlow circle, which has recently been excavated by Mr. Gray under the auspices of the British Association. Like the Avebury circle, Arborlow is surrounded by an embankment outside a ditch, the latter, therefore, obviously not intended for defensive purposes. All the stones are now flat, with the exception of one which is leaning, and in consequence of this it is extremely difficult to fix the circumferential line or diameter. The general plan, however, is oval. Mr. Lewis was of opinion that in the centre there was a group of three upright stones opening to a point somewhat north of east, and facing probably to the Beltane sunrise. A skeleton—apparently a late interment—was found in the centre, but part of the embankment on the south-east has been formed into a tumulus, which was found to contain an interment of the Bronze age. Mr. Lewis was of opinion that sepulture was no part of the original purpose of the monument. Mr. Lewis also referred to other Derbyshire circles, including the "Wet Withins" and the "Nine Ladies." With regard to the latter, he was of opinion that the term "nine" as applied to standing stones simply meant "holy," and in support of this view he cited several instances of the sacred or mystic significance of the number.—Mr. Lewis also read a paper on some notes on orientation. He began by referring to the association—pointed out by Dr. Rivers—between south and right in Welsh and other languages, and considered that the reason was that, when the connection first arose, the people, for some ceremonial purpose, were accustomed to turn to the east on certain occasions, when their right sides would become their south sides, and he incidentally referred to the almost universal practice of church-goers of turning to the east at the recitation of the Creeds. He felt, therefore, that it was possible

that the connection went no further back than the origin of this present-day custom, but still it might have originated in far remoter periods. The Greeks looked upon the right side as prosperous, while the Romans looked upon it as unlucky; but this was due to the fact that, while both peoples looked upon the north-east as the favourable quarter, the Greeks in their auguries turned to the north, while the Romans turned to the south. Mr. Lewis mentioned many instances showing how the north was looked upon as unlucky and the south as lucky, but this belief is by no means universal, and on the whole the north-east seems to be considered the most favourable quarter, and then the east. Summarising, Mr. Lewis was of opinion that on the whole the quarter from which the sunlight came was considered most favourable, and that the question of the favourableness of the right or left sides depended on the position taken up at the ceremonies. In conclusion, Mr. Lewis referred to a sort of symbolism of three and one which he had noticed in several stone circles. In a small circle in the Isle of Man there was a combination of one and three stones, but in many instances natural objects—especially the peaks of hills—have been used to suggest the symbolism. This is particularly noticeable at the circle at Penmaenmawr, where the Great Orme and two other hills make a trinity to the north-east, and at the circle on Bodmin Moor, where the three tips of Brown Willy are visible, due east of the circle, over a low intervening ridge.

Entomological Society, May 6.—Prof. E. B. Poulton, F.R.S., president, in the chair.—Mr. Willoughby Gardner exhibited nest cells of *Osmia xanthomelana* from Conway, North Wales. He said the species, one of our rarer mason bees, places its beautifully constructed pitcher-shaped cells at the roots of grass, usually four or five together. There is no previous record of the nest having been found since Mr. Waterhouse discovered and described it from Liverpool about sixty-five years ago.—Mr. M. Jacoby exhibited *Arsoa longimana*, Fairm., and *A. aranea*, from Madagascar, the only other specimens of these species he knew of being in the British Museum collection. He also exhibited *Megalopus melipona*, Bates, and *M. pilipes* from the Amazon, which bore a remarkable resemblance to a bee.—Mr. A. J. Chitty exhibited *Hydroporus bilineatus*, Sturm., a water-beetle new to Britain, discovered by Mr. Edward Waterhouse among some specimens of *Hydroporus* from Deal, given by Mr. Chitty to him as *H. granularis*. He also exhibited a specimen of the rare *Trechus rivularis* (incilis of Dawson), taken at Wicken Fen in August, 1900.—Mr. O. E. Janson exhibited specimens of *Neophaedimus melaleucus*, Fairm., a goliath beetle from Upper Tonkin, and remarked that the white colouring was derived from a dense clothing of peculiar semi-transparent coarse scales which were apparently easily removed by abrasion, and seemed to partake of the nature of the "fugitive" scales found upon freshly-emerged specimens of *Hemaris* and other Lepidoptera.—The president read a communication from Mr. G. F. Leigh on protective resemblance and other modes of defence adopted by the larvæ and pupæ of Natal Lepidoptera. He also exhibited the cocoons of *Eublemmistis chlorozonea* to illustrate the paper. Prof. Poulton also showed a specimen of *Polygonia C-album* in the attitude of prolonged repose, together with specimens of *Anaea moeris* set in different ways to illustrate its probable resting position. He said that probably the "C" or "comma" on the under surface of the hind-wings in butterflies belonging to the genus *Polygonia* (Graptæ) represented in bright, strongly-reflecting "body-colour" the light shining through a semi-circular rent in a fragment of dead leaf.—Mr. G. A. J. Rothney communicated descriptions of twelve new genera and species of Ichneumonidæ, and three new species of Ampulæx from India, by Peter Cameron.

Linnean Society, May 7.—Prof. S. H. Vines, F.R.S., president, in the chair.—The Ingolfiellidæ, fam. n.; a new type of Amphipoda, by Dr. H. J. Hansen. The greatest depth explored by the Danish Ingolf expedition in the summers of 1895 and 1896 was that of 1870 fathoms, a little south of the entrance to Davis Strait. A small quantity of bottom material showed several forms new to science, amongst which was a single specimen, having a likeness to the Caprellidæ, but with pleopods markedly differing from those of any known Amphipod. Some years later the

author examined a specimen of an allied species obtained by Dr. Th. Mortensen from an island in the Gulf of Siam. These two new species, *Ingolfiella abyssi* and *Ingolfiella littoralis*, one abyssal from the North Atlantic, the other from shallow water in the Pacific, agree in being extremely minute.—On the evolution of the Australian Marsupialia; with remarks on the relationships of the marsupials in general, by Mr. B. Arthur **Bensley**. The paper contains a minute description of the dentition of more than forty genera, and treats also of the structure of the hind foot. Mr. Bensley considers that the primary division of the Marsupialia should be based on the condition (syndactylous or eleutherodactylous) of the second and third digits of the hind foot, rather than on the condition (polyprotodont or diprotodont) of the incisor teeth; and he is disposed on this account to associate the Peramelidæ more closely with the Phalangeridæ than has hitherto been customary. The author regards the Australian marsupials as probably monophyletic, and considers, with Winge, that the ancestral forms were primitive members of the Didelphidæ, a family which must have had a wide geographical distribution in past times. A study of the dentition impels him to the conclusion that the primitive types were all insectivorous, but that the subsequent radiation, or divergent evolution, proceeded along two primary lines, one carnivorous, culminating in *Sarcophilus*, the other omnivorous and finally herbivorous. In the second line all of the advanced forms are diprotodont, and all of the typical terminal forms are highly specialised herbivora.—Copepoda Calanoida, chiefly abyssal, from the Faroe Channel and other parts of the North Atlantic, by Canon A. M. **Norman**, F.R.S. Most of the Copepoda mentioned were procured by Sir John Murray in the *Triton* expedition of 1882, at various depths to 600 fathoms; a few were from the *Valorous* expedition of 1875; the remainder from a gathering sent by Prof. Haddon from 200 fathoms forty miles N.N.W. of Achill Head. Some of the specimens have been examined and named by Prof. G. O. Sars, and the great interest of the observations now laid before the Society consists in the record of the geographical distribution of these small but ever active crustaceans. Thus, some of the Faroe Channel species found at considerable depths were taken by F. Nansen near the surface at the point reached by him nearest the Pole; the varying depths at which these organisms occur constitute isothermal lines, which largely determine their dispersion.

DUBLIN.

Royal Irish Academy, May 11.—Prof. Atkinson, president, in the chair.—Captain G. E. H. **Barrett-Hamilton** read an abstract of some results of his researches into the meaning of winter whitening in mammals and birds inhabiting snowy countries, and the occurrence of white markings in Vertebrates generally. He finds that the first-named colour-change is not a merely external factor having as its purpose the adaptation of the animal to its environment, but a peripheral atrophy symptomatic of deep physiological changes occurring in species possessing a metabolism which varies with the season. Thus the white colour affects the different parts of the body in the same order as that in which subcutaneous fat is accumulated in the panniculus adiposus. The author further finds a connection between much of the permanently white parts of Vertebrates and the accumulation of subcutaneous fat. Such white colour is then due to peripheral atrophy. This atrophy may manifest itself either in deficiency of pigment or in complete absence of hair.—Captain **Barrett-Hamilton** also read a description of a remarkable addition to the list of British mammals of boreal type. This is a bank vole (*Evotomys*) inhabiting the small island of Skomer, off the coast of Pembrokeshire.—Mr. G. H. **Carpenter** read a paper on the relationships between the classes of the Arthropoda. In opposition to certain recent speculations as to the independent origin of insects, arachnids, and crustaceans from annelid worms, the author advocates a common Arthropod ancestry for the various classes. The conclusion drawn from the numerical agreement in segmentation between typical members of the three great Arthropod classes is that the ancestral arthropods possessed such a definite and limited number of segments, and

that those groups with a large number of segments, such as most centipedes and millipedes, and many branchiopoda and trilobites, represent abnormal developments.

PARIS.

Academy of Sciences, May 25.—M. Albert Gaudry in the chair.—The action of acetylene upon caesium-ammonium and rubidium-ammonium. The preparation and properties of the acetylenic acetylides $C_2.Cs_2.C_2H_2$, $C_2Rb_2.C_2H_2$, and the carbides of caesium and rubidium, by M. Henri **Moissan**. By the action of acetylene upon solutions of caesium and rubidium-ammonium compounds of the type $C_2R_2.C_2H_2$ are formed, from which the carbides C_2R_2 can be obtained by heating *in vacuo*. These carbides react with water, giving the alkali and pure acetylene; they are extremely energetic reducing agents, acting upon the peroxides of lead and manganese with explosive violence.—The influence exerted on the rotatory power of cyclic molecules by the introduction of double linkages into the nuclei containing the asymmetric carbon atom, by M. A. **Haller**. The condensation products obtained by acting upon methylhexanone with aldehydes in presence of sodium methylate have been examined for their rotatory power. The effect of the double linkage is in every case to increase the rotation.—On new sources of radiations capable of traversing metals, wood and other substances, and on the new actions produced by these radiations, by M. R. **Blondlot**. By applying the method described in an earlier paper, using the electric spark as a detector, radiations similar to those detected in the light from an incandescent mantle have now been found to be emitted from an ordinary Argand burner, and from a sheet of incandescent silver. The effects are observed after the radiations have passed through 0.3 mm. of aluminium, black paper, &c., and in the case of the polished silver sheet are polarised, but the polarisation disappears when the silver is covered with lamp black. The name *n*-rays is suggested for these radiations. The *n*-rays are incapable of exciting phosphorescence in bodies which acquire this property under the action of light, but sulphide of calcium, already slightly phosphorescent, shows an increase in lustre when exposed to these rays.—M. Munier-Chalmas was elected a member in the section of mineralogy in the place of the late M. Hautefeuille.—On the development of a given function in series by means of Jacobi polynomials, by M. W. **Stekloff**.—On the integrability of a differential expression, by M. P. **Montel**.—On a theorem of Lejeune-Dirichlet, by M. A. **Pellet**.—On double cylindrical networks, by M. L. **Raffy**.—On the deformation of surfaces, by M. Maurice **Servant**.—The law of displacement of thermodynamic equilibrium, by M. E. **Ariès**.—On the simultaneous variation of solar spots and terrestrial temperatures, by M. Alfred **Angot**. If at any given station the mean annual temperatures, *t*, present a variation parallel to the number of sun-spots, *r*, the relation $t = t_0 + ar$ will hold approximately, *t*₀ and *a* being constants characteristic of the station. This formula is applied to ten years' observations from Guadeloupe.—The thermal conductivity of crystallised bismuth, by M. F. Louis **Perrot**. The conductivity is greatest perpendicular to the axis, and in the direction of the line of easiest cleavage.—On Hertzian waves in wireless telegraphy, by M. G. **Ferrié**.—On the polarised light diffused by refraction, by M. A. **Lafay**.—On the combined hydrogen contained in reduced copper, by M. Anatole **Leduc**. Five litres of air passed over a column of red-hot copper, in such a manner as to ensure superficial oxidation along its whole length, still leaves a weighable amount of hydrogen in the copper.—On the decomposition of lithium carbonate by heat, by M. P. **Lebeau**. Dissociation of lithium carbonate commences at about 600°, the dissociation pressure increasing to 91 mm. at 1000° C., and approaching 300 mm. at 1200° C. An attempt to prepare lithium oxide by heating the carbonate in a vacuum at 1000° was unsuccessful, as the oxide is itself volatile at this temperature, in which respect lithia is sharply differentiated from the alkalies and alkaline earths.—The electrolysis of barium sulphide with a diaphragm, by MM. André **Brochet** and Georges **Ranson**. Polysulphides of barium are formed at the anode, and baryta at the cathode. The latter being placed in a porous pot, the baryta is obtained in a pure state.—On the mode of splitting up of mixed organo-magnesium compounds; the action of ethylene

oxide, by M. V. Grignard. The experiments of M. Blaise have been repeated under slightly different conditions, the ether being distilled off before water is added. Good yields of primary alcohols are thus obtained, ethyl magnesium bromide and ethylene oxide giving 82 per cent. of the theoretical yield of normal butyl alcohol.—On acetones containing acetylene linkages. A new synthesis of the pyrazols, by MM. Ch. Moureu and M. Brachin. Ketones of the type $R-C\equiv C-Co-R^1$, which can be prepared by the action of acid chlorides or anhydrides upon the sodium derivatives of substituted acetylenes, react with hydrazines to form pyrazols. The constitution of pyrazols prepared from unsymmetrical β -diketones can thus be fixed with certainty.—On some addition products of vinyl-acetic acid, by M. R. Lespieau.—The electrolytic separation of manganese and iron, of aluminium from iron or nickel, and of zinc from iron, by MM. HOLLARD and BERTIAUX. The separations are simplified by the reduction of the iron to the ferrous state by means of sulphur dioxide before proceeding to the electrolysis.—On a reaction of methyl violet in presence of sulphurous acid, by M. H. Causse.—On the determination of the respiratory exchanges in aquatic media, by MM. J. P. Bounhiol and A. Foix.—The mandibular glands of the larvae of the Lepidoptera, by M. L. Bordas.—On *Degeeria funebris*, a parasite of *Haltica ampelophaga*, by MM. C. Vanev and A. Conte.—On the browning of the vine, by MM. L. Ravaz and L. Sicard.—On the start of a lateral branch inserted on the axis after the division of the embryo, by M. P. Ledoux.—On the specialisation of parasitism in *Erysiphe graminis*, by M. Em. Marchal.—Sexuality in the genus *Monascus*, by M. P. A. Dangeard.—Contribution to the cytological study of chlorophyllian bodies containing metachromatic corpuscles, by M. Jules Villard.—On the presence of cadaverine in the products of the hydrolysis of muscle, by MM. A. Etard and A. Vila. Cadaverine was isolated in notable quantities from the products of the hydrolysis of muscle in a slightly decomposed state. The occurrence of considerable quantities of this alkaloid in slightly decomposed meat would appear to exclude the hypothesis of microbial formation.—The arrangement of the scales in *Mesosaurus tenuidens*, by M. Léon Vaillant.—Retinal inertia relating to the sense of form; its variation according to the criterium adopted. The formation of a wave of sensibility on the retina, by MM. André Broca and D. Sulzer.—The destruction of termites, by M. A. Loir. The ravages of these ants at Bulawayo were so great that special attempts were made to destroy them on the large scale. The use of gaseous sulphur dioxide proved very effectual.—On the artificial culture of the truffle, by M. Raphael Dubois.

DIARY OF SOCIETIES.

THURSDAY, JUNE 4.

ROYAL INSTITUTION, at 5.—Electric Resonance and Wireless Telegraphy: Prof. J. A. Fleming, F.R.S.
 CHEMICAL SOCIETY, at 8.—Imino-ethers corresponding to Ortho-substituted Benzenoid Amines: G. D. Lander and F. T. Jewson.—(1) Formation of an Anhydride of Camphoryloxime; (2) The Mutarotation of Glucose as influenced by Acids, Bases and Salts; (3) The Solubility of Dynamic Isomerides: T. M. Lowry.—(1) Isomeric Partially Racemic Salts containing Quinquevalent Nitrogen. Part X. The Four Isomeric Hydrindamine α -Chlorocamphorsulphonates $NR_1N_2H_3$; (2) Isomeric Compounds of the Type $NR_1R_2H_3$: F. S. Kipping.—The Hydrolysis of Ethyl Mandelate by the Fat Splitting Enzyme, Lipase: H. D. Dakin.
 RÖNTGEN SOCIETY, at 8.30.—On the Electric Field surrounding the X-Ray Tube: Rev. P. Mulholland.
 LINNEAN SOCIETY, at 8.—Anatomy and Development of *Comys infelix*, Embleton, a Hymenopterous Parasite of *Lecanium hemisphaericum*: Miss Alice L. Embleton.—Notes on the Transition of Opposite Leaves into the Alternate Arrangement; a New Factor in Morphologic Observation: Percy Groom.

FRIDAY, JUNE 5.

ROYAL INSTITUTION, at 9.—The New Star in Gemini: Prof. H. H. Turner, F.R.S.
 PHYSICAL SOCIETY, at 5.—Special Meeting at University College.—Radio-active Processes: Prof. Rutherford.
 GEOLOGISTS' ASSOCIATION, at 8.—The Geology of Lower Tweedside, with Special Reference to the Long Excursion: J. G. Goodchild.

SATURDAY, JUNE 6.

ROYAL INSTITUTION, at 3.—The "De Magnete" and its Author: Prof. S. P. Thompson, F.R.S.

MONDAY, JUNE 8.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Journeys in Mongolia: C. W. Campbell.
 INSTITUTE OF ACTUARIES, at 5.—Annual General Meeting.

WEDNESDAY, JUNE 10.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—The First Year's Work of the National Antarctic Expedition: The President.

THURSDAY, JUNE 11.

ROYAL SOCIETY, at 4.—Election of Fellows.—At 4.30.—*Probable papers*: The Bending of Electric Waves round a Conducting Obstacle; Amended Result: H. M. Macdonald, F.R.S.—On the Propagation of Tremors along the Surface of an Elastic Solid: Prof. H. Lamb, F.R.S.—The Diffusion of Salts in Aqueous Solutions: J. C. Graham.—On the Structure of Gold Leaf, and the Absorption Spectrum of Gold: Prof. J. W. Mallet, F.R.S.—On Reptilian Remains from the Trias of Elgin: G. A. Boulenger, F.R.S.—A Method for the Investigation of Fossils by Serial Sections: Prof. W. J. Sollas, F.R.S.—An Account of the Devonian Fish, *Palaeospondylus Gunnii*, Traquair: Prof. W. J. Sollas, F.R.S., and Miss Igerna B. J. Sollas.—The Measurements of Tissue Fluid in Man; Preliminary Note: Dr. G. Oliver.

MATHEMATICAL SOCIETY, at 5.30.—Quaternions: Major P. A. MacMahon.—Automorphic Functions and the General Theory of Algebraic Curves: Mr. H. W. Richmond.—Jacobi's Construction for Quadric Surfaces: Prof. G. B. Mathews.

FRIDAY, JUNE 12.

PHYSICAL SOCIETY, at 5.—Some Experiments on Shadows in an Astigmatic Beam of Light: Prof. S. P. Thompson.—The Positive Ionisation produced by Hot Platinum in Air at Low Pressures: O. W. Richardson.—On a Method of Determining the Viscosity of Pitch-like Solids: Prof. F. T. Trouton and E. S. Andrews.

ROYAL ASTRONOMICAL SOCIETY, at 5.
 MALACOLOGICAL SOCIETY, at 8.—A List of Species of Mollusca from South Africa, forming an Appendix to G. B. Sowerby's "Marine Shells of South Africa": E. A. Smith.—On a New Genus, Planorbis, Moore, from the Albert Edward and Albert Nyanzas: J. E. S. Moore.—Notes on Some Jurassic Shells from Borneo, including a New Species of Trigonina: R. Bullen Newton.—Description of *Marginitella lateritia*, n.sp., from the Andaman Islands: J. C. Melville and E. R. Sykes.—New Mollusca from New Zealand: Rev. W. H. Webster.

CONTENTS.

PAGE

Infinite Series. By G. B. M.	97
A Plea for Interaction. By G. S. B.	98
The New Encyclopædia	98
Bio-Chemistry. By A. McK.	99
Our Book Shelf:—	
Howe: "Metallurgical Laboratory Notes."—	
T. K. R.	100
Gillies and Hall: "Nature Studies in Australia."—	
R. L.	100
Petrilli: "Considerazioni agrarie sul Piano di Capitanata"	100
Gore: "The Stellar Heavens"	101
Stebbing: "Departmental Notes on Insects that Affect Forestry"	101
Treadwell: "Analytical Chemistry."—J. B. C.	101
Letters to the Editor:—	
Coleridge's Theory of Life.—Sir Samuel Wilks, Bart., F.R.S.	102
Psychophysical Interaction.—Oliver Heaviside, F.R.S.; (With Diagram.) G. W. Hemming	102
Atmospheric Electricity. By C. T. R. Wilson, F.R.S.	102
Rainfall and River Flow in the Thames Basin. By Dr. Hugh Robert Mill	104
J. V. Laborde (1830-1903). By Dr. J. Deniker	105
Notes	106
Our Astronomical Column:—	
A Reported Projection on Mars	111
Report of The Oxford University Observatory	111
Periodicities of the Tidal Forces and Earthquakes	111
Mishongnovi Antelope-Snake Ceremonies. (Illustrated.) By George A. Dorsey	111
Were the Fern-Cycads Seed-bearing Plants?	113
"Tabloid" Preparations for Photography	114
A New Index of Applied Science. By G. W. de T.	114
Triassic Cephalopods	115
University and Educational Intelligence	115
Societies and Academies	116
Diary of Societies	120